

from
**Backyards
to Borders**

Federal Environmental Action
in Canada's Communities

Canada



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to Borders**

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in Canada's Communities**

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Ce rapport est aussi disponible en français
sous le titre : Un arbre, un jardin . . . un monde!





Message from the Prime Minister


In the past four years, the Government of Canada, working cooperatively with industry, governments, environmentalists and individual citizens, has acted to protect our natural environment.

As a result, environmental concerns are in the mainstream of public opinion and in the mainstream of public policy. **From Backyards to Borders** describes just a few of the many programs being carried out by departments of the Government of Canada, in conjunction with other governments, industry and organizations across the country.

The programs demonstrate what can be accomplished when the sense of shared responsibility is translated into shared action. You may well find a project or plan that meets some of your concerns or that parallels activities in your community. You will certainly find here the strength of the commitment the people of Canada and their governments have made, not just to a good standard of living, but to a good standard of life.

A handwritten signature in black ink, reading "Brian Mulroney". The signature is written in a cursive, flowing style.

The Right Honourable Brian Mulroney,
P.C., M.P.



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Preserving Canada's natural heritage

Fed by the massive glaciers of the St. Elias Mountains and flowing through the spectacular wilderness landscapes of Kluane National Park Reserve is the Alsek River. Only 90 km in length, and for the most part unnavigable even by kayak, the Alsek nevertheless takes its place alongside Canada's great waterways. In 1986, the Alsek and the historic French River in Ontario became the first two waterways in the country to be designated as Canadian Heritage Rivers.

An outstanding representation of our northern natural heritage, the Alsek region is home to one of the largest concentrations of grizzly bears in Canada, and offers visitors glimpses of golden eagles, trumpeter swans and Dall sheep.

The Canadian Heritage Rivers System (CHRS) is a cooperative venture among the federal government, the two territories, and, to date, seven participating provinces. It was established in 1984 to give national recognition to the role of waterways in the development of Canada, while promoting long-term management practices that conserve their natural, historical and recreational values. Nomination and management of heritage rivers remain with the government now responsible for the rivers — the federal and territorial governments jointly in the North, the federal government in national parks and other federal lands, and the provinces in southern Canada. Individuals and citizen groups are invited to present suggestions to their federal, provincial or territorial parks agency.

The program is directed by a board representing Environment Canada, Indian and Northern Affairs Canada, and participating provincial and territorial governments. A secretariat within the Canadian Parks Service of Environment Canada provides planning and administrative support.

Four other rivers have been designated as Canadian Heritage Rivers under the program: the South Nahanni in the Northwest Territories, Saskatchewan's Clearwater, the Bloodvein in Manitoba, and the Mattawa in Ontario.

Nominated rivers include: the Thirty Mile section of the Yukon; three rivers in national parks — the Athabasca in Jasper, the North Saskatchewan in Banff and the Kicking Horse in Yoho; the Missinaibi, the Bloodvein and the Boundary Waters section of the Voyageur Waterway in Ontario; the Jacques Cartier in Quebec; and New Brunswick's St. Croix.

For more information, please contact:

The Secretary
Canadian Heritage Rivers System
c/o Canadian Parks Service
Environment Canada
Ottawa, Ontario
K1A 0H3



Haines Junction, Yukon





Arctic Bay, Northwest Territories

Planning for balanced development in the North

Facing resource development pressures that could affect their traditional way of life, residents of Arctic Bay and other communities in the eastern High Arctic have been participating for the last three years in an unprecedented exercise to ensure the conservation and appropriate use of the northern environment. Working with native organizations, industry and governments, they have helped create a draft Lancaster Sound Land Use Plan that deals with the needs of the region's people and resources in a balanced way.

Arctic Bay, an Inuit hamlet of 500, is located at the northern tip of Baffin Island. Nestled into a small bay, its Inuktitut name, Ikpiarjuk, means "bag" or "pocket". Its English name commemorates the 1872 visit of the whaling vessel "Arctic". Nomadic Inuit have hunted in the area for about 5000 years.

The region contains one of the richest marine environments in the Arctic, as well as a breathtaking diversity of landscapes, from lowlands to fjords and ice-capped mountains. It may also be rich in oil, natural gas and minerals. Residents are concerned that the impacts of resource development could affect their traditional way of life. Wildlife harvesting continues to be of primary importance to the local economy. An extended shipping season, for example, could scare away marine mammals and reduce opportunities for both hunting and tourism.

Covering a vast area of more than 1.5 million km², the draft Lancaster Sound Plan reflects the federal government's belief that in the

North the relationships between resource development, traditional land use and conservation are too important to be decided by any one group. It is essential that all affected groups contribute to decisions.

The Plan, prepared by the Northwest Territories Land Use Planning Commission, is based on extensive community consultation and workshops, research, mapping and discussions with the Tungavik Federation of Nunavut and other Inuit groups, industries and public interest groups. Besides Arctic Bay, participating communities are Clyde River, Grise Fiord, Nanisivik, Pond Inlet and Resolute Bay.

The plan proposes a series of key principles for future development:

- Wildlife harvesting by the Inuit will continue to be the region's primary use of the land, as it has for thousands of years. Domestic harvesting will be the main use, though commercial harvesting will be allowed where stocks permit.
- A network of protected areas — national parks, wildlife areas and migratory bird sanctuaries — may be the best means of protecting key environments as well as cultural and historical sites.
- Improved communication links will help communities keep up to date on land-use activities, scientific research, shipping routes and other land-use concerns.
- While job creation within the region is a priority, communities and industries will work together to achieve the best balance of employment and traditional lifestyle. For example, in the case of non-renewable resource development, camps are preferred over

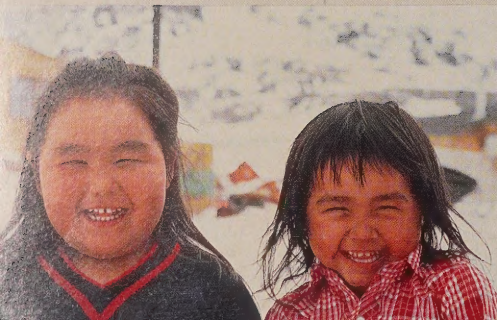
any new single-industry community. Travel routes and effects of shipping on marine mammals also must be resolved before year-round shipping can take place.

- Residents of the region will take part in setting priorities for scientific studies and research work.

Besides the Lancaster Sound regional plan, planning work is also under way in the Mackenzie Delta/Beaufort Sea area, and preliminary work is being done in Dene/Metis communities. A land-use plan will also be prepared for the Kluane region of the Yukon. Indian and Northern Affairs Canada coordinates federal participation in the effort.

For more information, please contact:

Resource Planning and Coordination
Natural Resources and Economic
Development Branch
Indian and Northern Affairs Canada
Ottawa, Ontario
K1A 0H4



Protecting the endangered arctic bowhead whale

Isabella Bay, near this Baffin Island community of 500, provides critical habitat for the world's largest known concentration of the endangered eastern arctic bowhead whale. The magnificent whales grow to lengths of 18 metres and can weigh up to 70 tonnes. Notable for their enormous store of blubber, the bowheads were prize catches for whalers until the early 20th century. Now numbering only a few hundred in the eastern Arctic waters, the bowhead population has not increased in the past 75 years.

Protected from hunting by Canadian and international whaling regulations, the whales are now the object of intensive efforts to help the species recover.

To ensure that local concerns are part of any program to protect the whales, a community-based effort is under way in Clyde River to determine options for protecting the bowhead and for local involvement in managing the Isabella Bay area. Residents have assisted research teams in conducting bowhead studies, and have participated in meetings and workshops to express their views.

Conservation plans will also address the land uses and activities that should be allowed in the bay area. For example, the tourism potential of the bowheads already is attracting international attention and prompting debate among local residents. One conservation idea receiving serious attention is the establishment of a marine park, supervised by local residents, to protect the whale population. Other possibilities include a whale sanctuary, and a combination of protec-

tion mechanisms such as a sanctuary, biosphere reserve and archaeological site.

The community strategy is receiving support from the World Wildlife Fund, in cooperation with the Clyde River Hunters and Trappers Association. The Fund's research and field studies have been supported by two federal departments, Fisheries and Oceans Canada and Indian and Northern Affairs Canada, and the Government of the Northwest Territories.

The Clyde River initiative is one example of a range of recent northern conservation programs, and fits within the context of a Canadian Arctic Marine Conservation Strategy put forward by Fisheries and Oceans Canada. Other conservation strategies have addressed local issues as well as complex, circumpolar questions dealing with transboundary concerns such as the transport of air pollutants and global climate change. The strategies are being developed in close cooperation with native organizations, communities and the federal and territorial governments.

For more information, please contact:

Land Use Planning and Conservation
Indian and Northern Affairs Canada
Ottawa, Ontario
K1A 0H4

or

Communications Directorate
Fisheries and Oceans Canada
Ottawa, Ontario
K1A 0E6



Clyde River, Northwest Territories





Fort Smith, Northwest Territories

Saving the endangered whooping crane

For more than 30 years, scientists and technicians living and working in Fort Smith have played an important role in an international effort to prevent the extinction of the whooping crane. The fate of the great white bird has become a powerful symbol in the battle to prevent the extinction of wildlife species on the planet.

Fort Smith, on the boundary between Alberta and the Northwest Territories, is the service centre for Wood Buffalo National Park, the largest park in Canada's system. The park contains the world's largest free-roaming herd of bison — and the nesting grounds for the whooping crane.

The cranes once ranged over most of central North America, but by 1941, over-hunting and destruction of habitat had reduced the species' population to a small flock of 21. The flock migrated between Wood Buffalo and its wintering grounds at a wildlife refuge on the Texas Gulf Coast. The cranes' future would have been desperate without a joint Canadian-American commitment to save the birds.

Years of dedicated work and cooperation have moved the cranes back from the brink of extinction. A recovery plan has been developed and is being implemented. Sanctuaries, rigid protection from shooting and a captive breeding program have increased the wild flock to 150 birds. A second flock has been established in Idaho, and a third may soon be established in Florida. Canadian scientists are considering the establishment of a captive flock at a zoo as further insurance for the species against disease, bad weather or other disasters.

Although the whooping crane's survival is not guaranteed until it regains more of its former numbers and range, the flock that arrives each spring to nest in Wood Buffalo National Park will play a critical role in the effort. The public can also assist in the species' recovery by reporting sightings to the Canadian Wildlife Service. A "whooping crane hot-line" is available from April to June and from August to November: 306-975-5595.

The plight of the whooping crane is not unique. According to the Committee on the Status of Endangered Wildlife in Canada, 36 species in the country are currently considered endangered. To be saved from extinction, each will require a distinct and carefully managed recovery plan, similar to the one developed for the whooping crane.

For more information, please contact:
Canadian Wildlife Service
Conservation and Protection
Environment Canada
Ottawa, Ontario
K1A 0H3



Working with communities to increase salmon populations

In a community fish hatchery run by the Cowichan Indian Band near this Vancouver Island community, coho salmon eggs are kept in clean, free-flowing water and protected from movement and light. More than 90% will survive in this environment, compared to a rate of only 10% in nature. Eventually, the young fish will be released into the waters of the lower Strait of Georgia, contributing to the gradual rebuilding of chinook stocks for commercial and sport fishing.

Across the province, other Indian bands are operating similar hatcheries, community associations are building net pens and fish ladders, and volunteers are cleaning debris from streambeds.

The activities are all part of a highly successful citizen-government effort to increase salmon and trout populations in British Columbia. Operated jointly by Fisheries and Oceans Canada and the provincial government, the Salmonid Enhancement Program (SEP) was established in 1977 in response to a growing consensus that the once-mighty West Coast salmon fishery was seriously threatened.

By the late 19th century, the abundance of salmon in West Coast waters had led to the establishment of a strong fishing and canning industry. But by the 1970s, salmon numbers had been drastically reduced through over-fishing, pollution of rivers, construction of dams and destruction of spawning beds. With the cooperation of governments and industry, the SEP was launched to double the population of B.C. salmon by the 1990s, restoring it to pre-1900 levels.

Seven salmonid species are covered by the program. The federal government is responsible for managing and enhancing five species of salmon — coho, chum, sockeye, pink and chinook. The provincial government is responsible for cut-throat and steelhead trout.

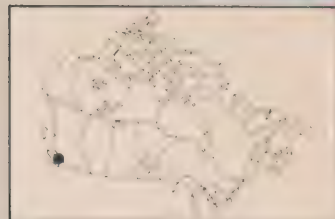
Citizen involvement is a major element of the enhancement program. The Cowichan Band project, for example, brings significant community economic development benefits. Not only are salmonid stocks enhanced through a system of hatcheries, net pens and remote incubators, but local people are provided technical and managerial training to carry out these operations. Of the 28 hatcheries funded under the program, 19 are run by native people. In many locations, SEP is restoring the salmon runs that form the basis of traditional native fishing, an important food source and cultural link to the past for many Indian bands.

Volunteers can become involved as individuals or through community groups, clubs and schools. Much of the program's volunteer activity focuses on assessment, hatchery operation and habitat improvement in the many small rivers and streams important to salmon. Each site is assessed to determine which techniques are appropriate for the species and location. Techniques include physical clean-up, placement of boulders, planting of stream-side vegetation, flow controls, counting fences, fish-way construction and hatchery operation.

Commercial trollers, gillnetters, sportsfishermen and seine boats are

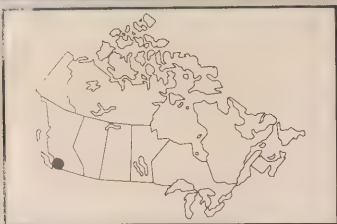
prime beneficiaries of the program's success, with SEP-produced salmon accounting for an estimated 16% of commercial catches in the province. The program has also improved recreational fishing in areas such as Barkley Sound and the Strait of Georgia.

For more information, please contact:
Communications Directorate
Fisheries and Oceans Canada
Ottawa, Ontario
K1A 0E6



*Duncan,
British
Columbia*





Agassiz, British Columbia

Keeping debris from coastal waterways

On the north side of the Fraser River, between the communities of Agassiz and Hope, is a trap for deadheads, sinkers and snags. Without the trap, all of the debris would have passed through the Fraser estuary and ended up in the heavily travelled coastal waterways of British Columbia, posing a hazard and nuisance for industry and individuals alike.

Waterborne debris can damage pleasure craft, seaplanes and shoreline structures, and interfere with commercial and sport fishing. Once a serious problem in the busy waters off the lower mainland, much of the debris from the Fraser River system now never reaches the coast, thanks to a joint federal, provincial, industry clean-up initiative, the BC Debris Control Board.

Founded in 1979, the board is supported by three federal departments/agencies — Forests Canada, Transport Canada and Fisheries and Oceans Canada — the provincial Ministry of Forests and Lands and the Council of Forest Industries of BC.

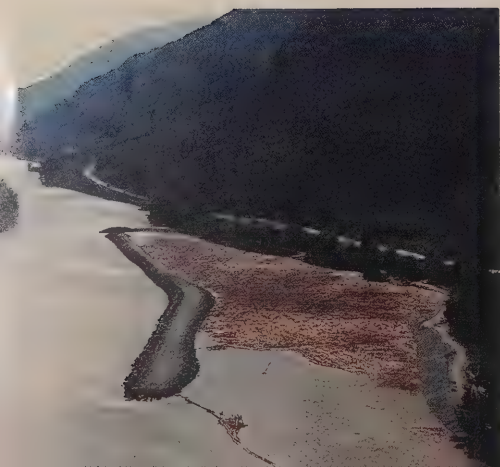
The Fraser River debris trap near Agassiz is the board's largest project. In a busy year, the trap will collect enough trees, wood chunks, barrels and other floating debris to cover eight football fields three metres deep. While nearly 60% of the material caught in the trap is natural debris, 39% comes from the forestry industry, and another 2% from other industries, such as construction.

The board also oversees a debris control and boom inspection program in Howe Sound. The program helps reduce log losses through good booming practices, and col-

lects industrial and natural debris for burning. As well, deadheads and debris in the Fraser Estuary are cleared up prior to the summer boating season and the commercial net-fishing season. The board works with fishermen to remove sunken trees and snags that interfere with salmon gill net fishing. It provides gear and heavy tugboats to remove the more difficult snags located by the fishermen.

For more information, please contact:

Communications Branch
Forests Canada
Ottawa, Ontario
K1A 1G5



Reducing adverse environmental impacts

Three mountain sheep stroll from their feeding range by the Vermilion Lakes towards the rocky slopes to the north, undisturbed by the roar of summer tourist traffic on a four-lane stretch of the Trans-Canada Highway only a few metres below them. At other points along a 27-km stretch of the busy highway, in the heart of Canada's first national park, elk, deer, moose and other wildlife are able to cross the pavement through similar overpasses and underpasses.

The safe crossing of park wildlife is one result of years of careful study and consultation through a public review process that is applied to major proposed projects, the federal Environmental Assessment and Review Process (EARP). Started in 1973, EARP assesses the likely environmental impacts of all major proposed projects for which the federal government has a decision-making authority.

In 1979, Public Works Canada proposed to "twin" (i.e., create a four-lane divided highway out of) a 27-km stretch of the existing two-lane Trans-Canada Highway in Banff National Park, from the park's east entrance to a point about 10 km west of the townsite. Concern was expressed that the construction phase and the expanded highway itself could have harmful effects on the area's fisheries, forests, rivers and water quality. Of particular concern was the potential impact of a four-lane highway on wildlife. Sheep, deer, elk and other ungulates frequently have to cross the highway to get to prime feeding ranges. The Vermilion Lakes

area on the valley floor, for example, is a crucial spring feeding range for ewes and lambs. Collisions between animals and vehicles were killing wildlife and endangering travellers.

The highway expansion proposal was referred to the Minister of the Environment for a public review by an independent panel. Following a series of hearings and technical studies, the panel recommended that the proposed twinning be allowed to proceed, providing certain steps were taken to mitigate adverse environmental effects.

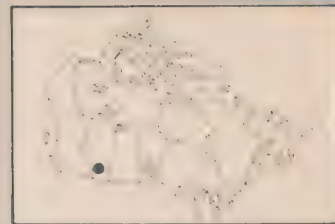
One of the most important protection measures was the construction of corridors over and under the Trans-Canada Highway to permit wildlife movement without interfering with highway traffic. Fencing was also installed along the highway to eliminate ungulate crossings at other points. Other recommendations of the review panel addressed land reclamation measures, revegetation, and protection of fisheries and water quality.

Only a small percentage of proposed projects proceed to an EARP panel for public review. All proposals are initially screened by the sponsoring departments or agencies, and a referral is made to a panel only when it is determined that the project is likely to have any significant environmental impact. The Federal Environmental Assessment Review Office (FEARO) assists departments in the development of screening guidelines and procedures.

In recent years, EARP panels have reviewed several major proposed projects and activities, including:

the second nuclear reactor at Point Lepreau, New Brunswick; development of the Hibernia oil field off the Newfoundland coast; and oil and natural gas development in the Beaufort Sea.

For more information, please contact:
Federal Environmental Assessment
Review Office
Ottawa, Ontario
K1A 0H3



Banff, Alberta





Medicine Hat, Alberta

Developing alternative fuels for Canadian transportation

Two Medicine Hat transit buses have been making a successful — and clean — impression on residents of this southern Albertan city. Since 1986, the buses have been carrying their passengers a few years into the future, as part of the first nation-wide field trials for using methanol as an economical, non-polluting fuel in Canada's bus and truck fleets.

Called Project MILE (methanol in large engines), the research and demonstration effort will determine the potential for replacing conventional gasoline and diesel with methanol, a liquid fuel derived from Canada's plentiful domestic supplies of natural gas.

Methanol, commonly known as wood alcohol or methyl hydrate, is extremely clean-burning, with none of the build-up of noxious emissions associated with the use of diesel fuels. On an equivalent energy basis, it also promises to be more economical than diesel, and it can be stored and transported in much the same way as gasoline and diesel.

The Medicine Hat buses, each with a special methanol engine built for the trials, operate on two regular city routes. On board each bus is a micro-processor that stores data on the performance of key engine components. Every day, a central computer collects and reviews the data, allowing researchers to spot and respond to any problems.

Medicine Hat is an ideal site for the demonstration project. A petrochemical company located in the city is one of three Western Canadian firms providing methanol fuel at no cost to the project, through the Canadian Oxygen-

ated Fuels Association. Response of city residents and officials to the buses has been enthusiastic. Medicine Hat Transit officials are already considering expanding the number of buses using methanol, and a local radio station has proudly painted its colours on the sides of one of the vehicles.

Field trials are also under way with city buses in Winnipeg, and in Vancouver with city garbage trucks and trucks operated by a moving and storage company.

Project MILE is an \$8-million program initiated by Energy, Mines and Resources Canada (EMR) in cooperation with the transportation and energy industries. EMR is providing half of the funds, with the rest shared among provincial and municipal governments and industry. Project activities will cover the full range of operating conditions that Canada's geography and climate present. Tests will focus on fuel distribution and dispensing, vehicle systems, vehicle performance and life-cycle considerations. An educational component of the project will help broaden awareness of alternative alcohol-based fuels for transportation in Canada.

For more information, please contact:
Office of Environmental Affairs
Corporate Policies Evaluation
Branch
Energy, Mines and Resources
Canada
Ottawa, Ontario
K1A 0E4



Conserving the soils of Canada's Prairies

A new research facility at Agriculture Canada's Swift Current, Saskatchewan, research station is helping scientists determine how Canadian farmers can literally grow their way out of a serious problem — too much salt in their soil. The problem afflicts more than 2 million hectares (ha) of prairie farmland to varying degrees.

The Salt Tolerance Testing Facility, built under a federal-provincial economic development agreement, is one of the latest weapons in the fight against soil degradation. According to some estimates, soil degradation could cost Canadian farmers up to \$1 billion a year in lost income.

Soil problems on the Prairies did not begin and end with the famous "Dirty thirties." In a region prone to recurring drought, good farmland is a precious but fragile resource. Ever since prairie land began to be cultivated in the late 19th century, the fertility of some areas has been declining. Decades of water and wind erosion and certain tillage practices have drastically reduced levels of organic matter, and vital nutrients such as sulphur and nitrogen have been lost in the process.

Saline soils on the Prairies have increased considerably in the last 15 years. Soil salinity commonly builds up in low-lying areas during dry periods. Groundwater rises through the arid, naturally salt-rich soil, picking up salts in solution. On reaching the surface, it evaporates, leaving behind salts, which cause many conventional crops to wither and fail. It is now recognized that years of summerfallowing — meant to conserve soil moisture — have

made the salinity problem worse, by bringing even more water to the surface.

Solutions to the problem focus on cropping systems that limit summer-fallowing and control soil moisture, including flexible cropping, use of deep-rooted and salt-tolerant crops, and surface drainage techniques.

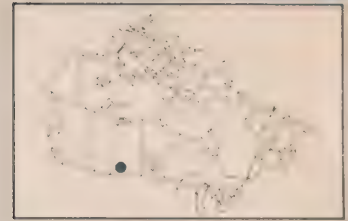
The Swift Current facility is testing the tolerance of crops at three different growth stages: germinating seeds, seedlings and mature plants. Researchers are also investigating plants that can live in saline soils, use plenty of water and make a profit for farmers, such as certain varieties of barley and alfalfa. Other researchers are examining the effects of excessive sodium in irrigation waters. The testing facility is housed in a thermally controlled greenhouse that permits year-round testing, including a yearly radiation cycle that parallels the region's natural growing season.

Agriculture Canada is undertaking a wide-ranging program to respond to the challenge of soil conservation across the country. The Prairie Farm Rehabilitation Administration (PFRA), established in 1935, promotes soil conservation and water development practices for farmers and ranchers in the three Prairie provinces. For example, the PFRA provides technical and financial assistance on such needs as erosion control and cropping practices, and has built more than 200 000 dams, reservoirs, dug-outs and irrigation projects to help farmers and small communities meet their water needs. In other provinces, the department assists soil conservation efforts through federal-provincial economic development agreements.

In L'Assomption, Quebec, for example, farmers are improving their soil-management practices thanks to grants under the federal-provincial agreement.

In 1987, Agriculture Canada also launched a three-year, \$75-million soil conservation initiative, to be matched by provincial funding, that will assist farmers in implementing conservation activities on their own land. The initiative will also help demonstrate new conservation techniques and increase public awareness about the issue.

For more information, please contact:
Communications Branch
Agriculture Canada
Ottawa, Ontario
K1A 0C7



*Swift Current,
Saskatchewan*





Wynyard, Saskatchewan

Cooperating to increase waterfowl populations

On the southeast shore of Little Quill Lake, just north of this town on the Yellowhead Highway, a heritage marsh is being established to serve as a prime production and staging habitat for mallard ducks. The marsh, part of a series of activities in the Quill Lakes area, is one of the first on-the-ground results of an ambitious effort on both sides of the Canada-US border to protect and increase population levels of waterfowl, the most prominent group of migratory birds on the continent.

Every year, millions of ducks, geese and swans depend for their existence on prairie potholes and sloughs from southern Manitoba to northeastern British Columbia, the largest stretch of prime waterfowl habitat in North America. While ducks and geese are highly prized as gamebirds by millions of hunters, an even larger number of people enjoy observing and photographing them. Yet waterfowl populations are threatened by the loss and degradation of their habitat through agricultural practices, urbanization and industrial development.

An effective response to this challenge requires broad-based, coordinated actions. The Canadian and United States governments have undertaken a 15-year cooperative effort to maintain and restore about 1.5 million hectares (ha) of waterfowl habitat across the continent. The North American Waterfowl Management Plan (NAWMP) should help to ensure habitat for more than 62 million breeding ducks on the continent, and a fall flight of more than 100 million birds. Activities include the promotion of soil and water conservation

practices on farmland, local zoning of land uses to prevent further destruction of habitats, and the provision of financial incentives to farmers and ranchers, to encourage them to manage their lands for waterfowl production, particularly for nesting habitat.

Environment Canada's Canadian Wildlife Service is coordinating federal action on the plan. Other participants include provincial and state wildlife agencies, naturalist and hunter organizations, subsistence users and individual landowners.

The Quill Lakes/Touchwood/Beaver Hills region, one of six designated areas in the province, was selected as the first site for a cooperative program under the NAWMP. Plans were developed by a committee of representatives from the Canadian Wildlife Service, Agriculture Canada, the Province of Saskatchewan and Ducks Unlimited Canada. Over the next five years, about \$6 million will be available for the Quill Lakes project from the Canadian and American governments, the province and private organizations.

The Quill Lakes project focuses on mallards, a species experiencing a population decline throughout North America, largely due to agricultural modification of upland nesting cover. The \$1.3-million heritage marsh development on Little Quill Lake involves the installation of water control structures, enhancement of upland nesting cover, and improvements to the grazing system.

Another major objective of the Quill Lakes project is to restore upland habitat for waterfowl. About

1355 ha of cultivated land will be converted to dense nesting cover, from which predators will be excluded by electrified fencing. About 2500 nesting structures will also be distributed in permanent wetlands throughout the region. A marginal land-conversion program introduced by Agriculture Canada will provide one-time payments to landowners to convert to permanent grass and legume cover about 16 000 ha of marginal lands that are presently cropped. As well, the Fosston Marshes, a highly productive waterfowl habitat currently threatened by drainage, are to be purchased through a cooperative project run by federal and provincial agencies and private conservation groups.

Other NAWMP pilot projects on the Prairies are under way in the Minnedosa area of Manitoba, and near Red Deer, Minburn and Lethbridge in Alberta.

To respond to the different requirements of each region, four Canada-US joint-venture committees will coordinate regional activities under the plan. In addition to the Prairies group, an Arctic Goose group is reviewing actions required to enhance goose and swan populations, while two committees are addressing problems of waterfowl habitat and the black duck in eastern Canada.

For more information, please write:
Canadian Wildlife Service
Conservation and Protection
Environment Canada
Ottawa, Ontario
K1A 0H3



Investigating air quality in Canadian homes

Yorkton children are helping federal health researchers determine the quality of air inside Canadian homes. About 870 children in kindergarten and grades one and two, together with their families, are part of a major effort to better understand the potential health effects of exposure to indoor air pollutants.

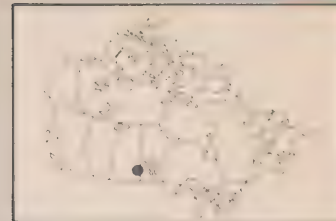
The family home is increasingly under study by scientists for the potential health impacts of common features of many residences. Home insulation, heating and cooling systems, stove types, humidifiers, dehumidifiers and the smoking habits of residents are among the features that may affect indoor air quality.

The major concern of the project is the possible effects of moulds, fungi and moisture within the home. Researchers will assess the respiratory health characteristics of participants. The respiratory system is most likely to be affected by indoor air pollutants, such as moulds and fungi.

The Health Protection Branch of Health and Welfare Canada is conducting the study, with financial support from Energy, Mines and Resources Canada.

Children and their families from about 30 communities are participating in the national study. Other communities are in Prince Edward Island, Quebec, Ontario, Saskatchewan and British Columbia.

For more information, please contact:
Communications Directorate
Health and Welfare Canada
Ottawa, Ontario
K1A 0L2



*Yorkton,
Saskatchewan*





Souris, Manitoba

Resolving Canada-US environmental disputes

The Souris River rises in the hills of southeastern Saskatchewan, flows south into the United States, then northward back into Canada, its waters finally flowing into the Red River system and Hudson Bay. There is little in its appearance to suggest that, until very recently, it was at the centre of a famous and heated argument between Canada and the United States going back more than 20 years. The successful conclusion to this argument reflects both countries' commitment to finding workable solutions to environmental disputes that recognize no boundaries.

In 1965, the US Congress authorized the first phase of the Garrison Diversion water project in central North Dakota. The diversion would have provided irrigation to a vast dryland area of the state just south of the Canadian border. A vital link in the plan was the proposed diversion of Missouri River waters into the Souris and on into the Hudson Bay drainage. Canada and Manitoba objected strongly to the plan, arguing that the diversion would not only affect water quality for towns along the Souris River, but also introduce new fish species into Lake Winnipeg, with potentially devastating effects on the lake's valuable commercial and sport fisheries.

The issue was referred to the International Joint Commission (IJC), an independent, bi-national group established by the 1909 Boundary Waters Treaty to help the two countries resolve cross-border water disputes. In its 1977 report, the Commission upheld the concerns of Canada and Manitoba, concluding that the proposed project would cause "significant injury

to health and property in Canada." The US Bureau of Reclamation offered design revisions to reduce the likelihood of problems, but Canada maintained that any chance was too high, and the debate, negotiations and counter-proposals continued for another nine years.

Finally, in 1986, the President of the United States signed into law a bill authorizing construction of a modified Garrison Diversion Unit in North Dakota that met all of Canada's concerns. The new design ensured the protection of the Souris and Red Rivers and of the rest of the Hudson Bay drainage basin, while also meeting North Dakota's priority water needs.

The IJC consists of six members, three appointed by each federal government. Besides the Garrison Diversion controversy, the commission has addressed transboundary environmental issues from one end of the Canada-US border to the other, including: the Skagit River Valley dispute between British Columbia and the City of Seattle; Saskatchewan's coal-fired power plant on the Poplar River near the Saskatchewan-Montana border; and the pollution of the Great Lakes.

For more information, please contact:
External Relations Directorate
Corporate Planning Group
Environment Canada
Ottawa, Ontario
K1A 0H3



Reducing health risks to artists and craftspersons

In a small downtown park near the confluence of the Assiniboine and Red Rivers, art students sit on the grass painting the short stretch of wall that remains from the original Fort Garry trading post. Lost in concentration, one of the painters absently dabs the bristles of the brush to his mouth, unaware of the potential dangers within the colours on his palette.

The world of arts and crafts is a source of livelihood and relaxation for hundreds of thousands of Canadians. It can also be a dangerous world for those who ignore the potential hazards of the materials they use: paint pigments suspected of causing cancer in laboratory animals; woodworking materials containing hazardous solvents; and unvented fumes from a pottery kiln that can be toxic to young children.

Hobbyist or professional, painter, potter, photographer, woodworker or any of a dozen others, all need to be informed about the materials used in their art or craft. The job need not be overwhelming or technical. A general understanding of how arts materials can affect the body, combined with a simple set of workshop and studio routines, will go a long way towards eliminating the most serious — and often the least obvious — hazards.

The Safer Arts, a recent 39-page handbook prepared by Health and Welfare Canada, provides this basic information for artists wanting to know more about the materials they use every day. The booklet includes general information about how hazardous arts materials can enter the

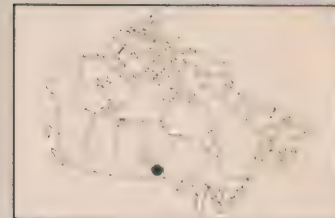
body, and how artists can assess exposure risks. It also includes an outline of common hazards and safe working habits for each of nine arts and crafts areas, and lists sources of further information on health and safety.

The handbook notes that toxic fumes, vapours, powders and other materials may enter the body in three ways: ingestion, absorption and inhalation.

Children who mistake an art substance for something edible are not the only ones in danger: accidental ingestion of toxic materials can also be hazardous to adults. It happens when they point their paintbrushes with their mouths, or ingest bits of clay that have dropped into their coffee cups. Many hazardous materials can be absorbed through the skin. Solvents, photographic developer solutions and other chemicals can result in burns and longer-term damage to internal organs. Finally, hazardous vapours and fumes may be inhaled, producing reactions that require immediate medical attention, as well as unsuspected delayed reactions that may elude diagnosis.

Children are at special risk from arts and crafts materials. Their growing bodies absorb toxic chemicals more quickly, and their immature lungs and immune systems make them more susceptible to fumes and other hazardous materials. The federal Safer Arts booklet outlines these risks and details precautionary measures for parents and those who supervise children.

For more information, including free copies of the booklet and accompanying posters, please contact:
Communications Directorate
Health and Welfare Canada
Ottawa, Ontario
K1A 0L2



*Winnipeg,
Manitoba*





Windsor, Ontario

Cooperating to clean up the Great Lakes

One of the most famous landmarks in this city — and indeed along the entire Canada-United States border — is the Ambassador Bridge, spanning the Detroit River. The river is at once the source of drinking water for more than 3.7 million people, a supplier of water to industry, a major shipping route and a boater's haven. Only 50 km in length, it also receives untreated municipal sewage, industrial waste, and runoff from city storm sewers and agricultural lands.

Great Lakes pollution is not a recent phenomenon. The International Joint Commission, established in 1909 by the Boundary Waters Treaty, has been examining the problem for nearly 80 years. More than \$8 billion has been spent on clean-up by the two federal governments, two provinces and eight states. But what is new is an innovative, community-based approach to finding a consensus for clean-up action among governments, industries and residents on both sides of the lakes.

The Detroit River is one of 42 special "areas of concern" along the entire Great Lakes system that are targeted for international clean-up efforts under a Canada-US Great Lakes Water Quality Agreement. From Thunder Bay to the St. Lawrence River, from major metropolitan areas like Windsor-Detroit and Toronto, to one-industry towns, from point-pollution sources to leakage of toxic chemicals, each site faces unique circumstances.

Seventeen of the sites are in Ontario, including five bi-national locations: the St. Lawrence and Niagara Rivers, shared between

Ontario and New York; and the Detroit, St. Clair and St. Mary's Rivers, shared between Ontario and Michigan.

For each area of concern, a Remedial Action Plan (RAP) will identify pollution sources, define realistic water uses and water quality objectives, and propose remedial measures. The federal and Ontario governments are jointly funding and coordinating the RAPs.

Public participation is an essential component of the plans, as people work toward reaching a consensus despite conflicting priorities. Within each community, a public advisory group, representing a wide range of interests and concerns, has been established to act as an ongoing advisor and communicator. Information meetings, newsletters and direct mailings will reach larger audiences. Plans are to be completed by 1990 and submitted to the appropriate governments.

The Detroit River RAP has a bi-national public advisory committee, with about 20 representatives from both sides of the Ambassador Bridge. All of its meetings are open to the public. The three Ontario-Michigan RAPs also share a toll-free telephone line to provide information and assist the public.

For more information, please contact:
Communications Directorate
Environment Canada
25 St. Clair Ave. E.
Toronto, Ontario
M4T 1M2



Understanding the impacts of acid rain on children's health

About 700 youngsters in this southern Ontario community will be participating in the first Canada-US study on the health effects of acid rain. Scientists hope that the research results will help explain the significance of decreased lung capacity of persons living in cities that have high acid rainfalls.

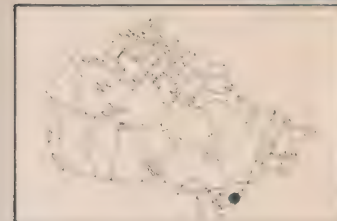
With their parents' permission, the Dunnville children, aged seven to 11, will perform simple breathing tests in school and have their height and weight recorded. The project will be made part of a classroom exercise on how the lungs work, and how the quality of air we breathe affects the lungs.

While acid rain's impacts on forests, fisheries and water quality are becoming better understood, evidence of what it does to human health is inconclusive. A 1986 study in 10 Canadian cities showed that the lung capacity of children living in areas with high levels of acid rain averaged about 2% less than that of children in communities with little or no acid rain. The study could not, however, attribute this difference directly to acid rain.

The new \$6-million study, being conducted by Health and Welfare Canada and Harvard University in the United States, will cover about 15 000 children in six Canadian and 18 American cities.

Dunnville was selected because it is located within a broad region where the prevailing winds bring acid rain north from the smelters and power plants of the Ohio Valley. Yet, as a non-industrial site, it produces no acid rain of its own. Other participating communities, such as Pembroke, Ontario, lie outside this region and so offer a basis for comparison. Monitoring is also under way in communities in Connecticut, New Jersey, Tennessee, Virginia and California.

For more information, please contact:
Communications Directorate
Health and Welfare Canada
Ottawa, Ontario
K1A 0L2



*Dunnville,
Ontario*





Hamilton, Ontario

Promoting Canada's environmental industries

A new Chair in Environmental Engineering at McMaster University may help Canadian industries demonstrate to the world that there are profits in pollution prevention. The Chair will build on Canada's reputation as a world leader in the development of "clean technologies" and contribute to the fast-growing environmental industries sector of the nation's economy, a sector that already directly employs more than 100 000 people.

The \$1.66-million Chair is a four-way partnership involving the Natural Sciences and Engineering Research Council, Environment Canada, the university and Texaco Canada. It will increase the supply and calibre of highly trained personnel and link the research and development capabilities of government, industry and the university community. Researchers will focus on urgent environmental problems such as wastewater treatment, industrial wastesite clean-ups and improved management of toxic chemicals.

"Clean technologies" is the term given to innovative industrial processes that can improve both industrial competitiveness and environmental protection by reducing pollution, recycling resources and helping to prevent costly clean-ups. With the increasing recognition that long-term economic growth is possible only through an integration of environmental and economic considerations, the demand for "clean technologies" is expected to grow dramatically world-wide. In Canada, governments and industry already spend an estimated \$7 billion a year on environmental services. The United States and the European

Economic Community each spend 10 times that much, and the market in developing nations will be even greater in the years ahead.

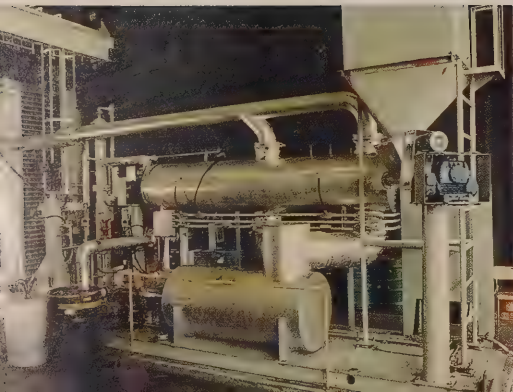
Canada is well positioned to become a world leader in key areas of the environmental industries sector. Already, an estimated 3000 Canadian companies are working in the field, developing and exporting state-of-the-art technologies in such diverse specialties as remote sensing, geographic information systems, environmental planning, environmental data modelling, chemical analyses and wastewater treatment.

A Canadian "clean technology" already generating significant international attention is the production of fuel oil from an unlikely source: sewage sludge. Canadians spend about \$100 million a year disposing of the sludge, a by-product of wastewater treatment processes for industrial and municipal wastes. Researchers at Environment Canada's Wastewater Technology Centre in Burlington focused on a technique of heating dried sludge to temperatures of about 350 degrees Celsius in an oxygen-free environment. The main by-product of the process is a usable fuel oil. Pilot-scale tests have been successful, and the next stage is to establish a full-scale demonstration at an operating treatment plant. By reducing the need for ocean dumping and landfilling of sludge, the Canadian process could revolutionize the way cities around the world cope with their wastes.

To promote Canada's environmental technology industry, the federal government is helping to organize an international trade show and conference, "Globe '90: Global Opportunities for Business

and the Environment", scheduled for Vancouver in 1990. The conference will bring together policy-makers, leaders in Canada's environmental industry field and representatives of potential international buyers of Canadian products and services.

For more information, please contact:
Technology Development and
Technical Services Branch
Conservation and Protection
Environment Canada
Ottawa, Ontario
K1A 0H3



Protecting the earth's ozone layer

Human activities are beginning to affect the planet at an unprecedented level, as revealed in widespread deforestation, desertification, oceanic pollution, and even changes in the composition of the earth's atmosphere.

In recent years, scientists have linked the widespread use of common industrial chemicals to the depletion of the atmosphere's fragile ozone layer — a layer of gases that protects us from the damaging ultra-violet rays of the sun. Ozone depletion could affect the world's ability to feed itself, reducing crop yields and damaging aquatic life and fisheries. It could also lead to increases in skin cancer and eye diseases.

The chemicals, known as chlorofluorocarbons (CFCs), are used in refrigeration and air conditioning products, in plastic foam materials such as fast-food packaging and furniture padding, as propellants in aerosol spray cans, and as cleaning solvents.

Understanding the complex changes to the ozone layer has been difficult enough. Finding workable solutions to the problem has been nearly impossible. But in September 1987, environmental history was made in Montreal with the signing of a pathbreaking international agreement to save the earth's ozone layer. For the first time, nations have collectively anticipated a potential global environmental disaster and have taken action to prevent it. Known as the Montreal Protocol, the agreement, once ratified, will freeze consumption of CFCs at 1986 levels and reduce emissions by 50% by 1999. It also

encourages international cooperation in introducing environmentally safe alternative chemicals and technologies to replace the CFCs.

Canada played a key role in the years of intense international negotiations that led to the Montreal Protocol. It was among the first nations to ratify the Protocol, and is aiming for reductions greater than the 50% called for in the agreement, in response to recent scientific findings that further reductions are necessary. A major international conference on the changing atmosphere, hosted by Canada in June 1988, called for the virtual elimination of most CFCs by the year 2000.

Environment Canada is charged with developing and implementing regulations to meet our obligations under the Montreal Protocol. Control measures might include the development of codes of practice and the introduction of restrictions on producers, importers and exporters of CFCs; recycling measures; recapture and re-use requirements; restrictions on non-essential uses; and product-labelling requirements. Such controls would allow the department to specify more precisely those products and product uses to be reduced or phased out. As well, the controls would ensure that adequate attention is given to reducing emissions of those chemicals with the highest ozone-depleting potential.

Canadian scientists are also playing a lead role in contributing to our understanding of the ozone problem. Environment Canada operates the World Ozone Data Centre, which for the past 20 years has collected data from a global

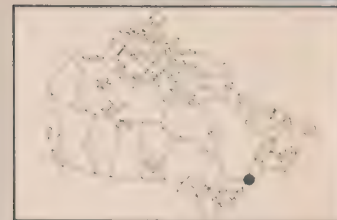
network of measuring stations. Five of the stations are in Canada: Toronto, Edmonton, Churchill, Goose Bay and Resolute. As well, the department's Atmospheric Environment Service has perfected the design of a state-of-the-art ground-based ozone-measuring instrument to improve the accuracy of readings throughout the world.

For more information, please contact:

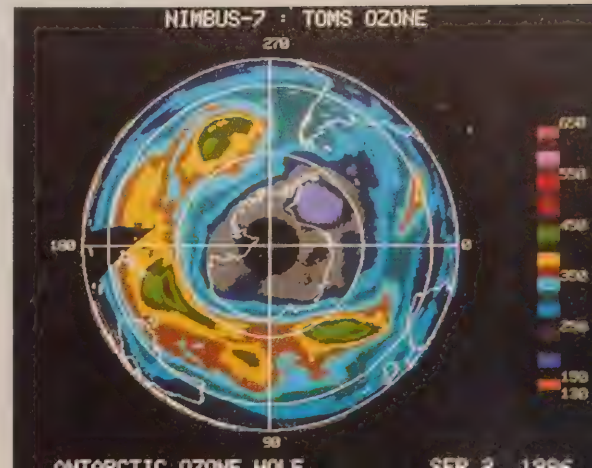
Commercial Chemicals Branch,
Conservation and Protection
Environment Canada
Ottawa, Ontario
K1A 0H3

or

Information Directorate
Atmospheric Environment Service
Environment Canada
4905 Dufferin Street
Downsview, Ontario
M3H 5T4



Montreal,
Quebec





St. Lambert, Quebec

Coordinating a broad-based effort to fight acid rain

In the first step in an innovative effort to mobilize grassroots support for cleaning up acid rain on both sides of the Canadian-American border, St. Lambert, on the south shore of the St. Lawrence River, has been "twinning" with towns in the State of Vermont.

The twinning is part of the Rainbow Project, launched by the Quebec-based public interest group, L'Association québécoise de lutte contre les pluies acides (AQLPA), with assistance from Environment Canada. The Rainbow Project will promote greater awareness in the United States about Canada's concerns over acid rain and about the need for a cooperative effort in both countries to reduce the problem at its source.

Acid rain is caused by emissions of sulphur dioxide (SO_2) and nitrogen oxides (NO_x). Once released into the atmosphere, these substances can be carried long distances by prevailing winds and return to earth as acidic rain, snow, fog or dust. When the environment cannot neutralize the acid being deposited, damage occurs. The main sources of SO_2 emissions in North America are coal-fired power-generating stations and non-ferrous ore smelters. The main sources of NO_x emissions are vehicles and fuel combustion.

Acid rain is causing serious economic, social and environmental problems in eastern Canada. It is increasing the acidity of lakes and streams to the point where aquatic life is depleted, and it is increasing the acidity of shallow groundwater. Acid rain is also one of the causes of forest decline, and a threat to

some waterfowl populations. Moreover, its effects are not limited to the natural environment; it erodes buildings and monuments, and is suspected of contributing to respiratory problems in children and asthmatics.

Economically, acid rain is endangering fisheries, tourism, agriculture and forestry in an area of eastern Canada that measures 2.6 million km^2 . The resource base at risk sustains approximately 8% of Canada's gross national product. The value of damage caused by acid rain in eastern Canada is estimated at \$1 billion annually.

To stop the damage being done by acid rain, action is required on two fronts. Canada must cut its emissions by half, and the trans-border flow of pollutants from the United States — which contributes half of the acid rain falling on eastern Canada — must also be reduced by about 50%.

In 1985, the federal government launched a \$330-million program to undertake a comprehensive assault on acid rain. A dozen federal departments are working with provincial governments, industries, citizen groups and concerned individuals. Under the Canadian Acid Rain Control Program, the provinces are putting measures in place to reduce total annual emissions of SO_2 from the Saskatchewan-Manitoba border east to 2.3-million tonnes by 1994 (50% of the level allowed in 1980).

Nearly 80% of the total Canadian emission cut-back will be achieved in Ontario and Quebec. With the cooperation and assistance of the federal government, programs in both those provinces have been



proceeding vigorously. Manitoba and the Atlantic provinces are similarly contributing to this country-wide effort. Even the westernmost provinces, which are least affected by acid rain, are taking preventive measures. For example, all new power plants in Alberta and Saskatchewan are meeting stringent emission limits. In 1986, total SO₂ emissions in the seven eastern provinces were about 2.8 million tonnes — 35% less than the level allowed in 1980. The Canadian house is well on its way to being put in order.

To reduce NO_x emissions from cars and trucks, the federal government has adopted tough emission standards requiring the use of state-of-the-art control technology. These standards have reduced allowable emissions from cars and light trucks by 67%, and will reduce those from heavy trucks and buses by 50%. The regulations will keep total national NO_x emissions at their current levels until the mid-1990s.

Over the past 15 years, Canadian governments, provincial utilities and the private sector have spent more than \$15 billion to reduce air pollution. Once fully implemented, the Canadian Acid Rain Control Program will cost the private sector and provincial utilities an estimated \$500 million annually. This is the largest environmental protection program ever undertaken in Canada.

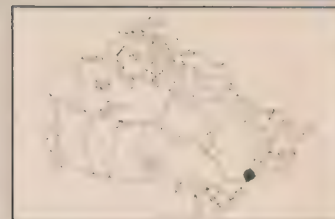
Solving Canada's acid rain problem now depends on US actions. Acid rain pollution from American industry and utilities contributes half of the acid rain in eastern

Canada, and in some areas, the fall-out from the United States amounts to 70% of the total. Canada, in turn, is the source of some of the acid rain that falls in the United States, but by the time Canada's program reaches its projected targets, its export of acid rain to the United States will have been cut by more than 50%.

Canada is pressing hard for US emission reductions, asking the United States to do nothing more than Canada itself is doing. Canada seeks a commitment from the US to establish its own emission control targets and schedules.

Canada is also undertaking a \$1.5-million communications program to take its case to the American people. The goal is to convince US citizens that their government should act to reduce acid rain-causing emissions. The campaign includes advertising directed at American tourists, and assistance to Canadian environmental groups to establish cross-border citizen action projects, such as the St. Lambert-Vermont twinning initiative.

For more information, please contact:
Inquiry Centre
Environment Canada
Ottawa, Ontario
K1A 0H3





Armagh, Quebec

Keeping Canada's forests healthy

In a forest near this small community 40 km southeast of Quebec City, ten tall spruce trees stand surrounded by soaring cages of steel and netting. The cages form a life-sized laboratory that is helping scientists better understand one of the most dangerous threats to eastern Canada's forests, the spruce budworm.

Built by Forests Canada researchers based at the Laurentian Forestry Centre in Sainte-Foy, the cages' 20-metre towers required 4 km of piping and a one-kilometre-long nylon net. The closed environment allows researchers to study the effects of birds on controlling the populations of spruce budworm. The pest, a delicacy for birds, can devastate huge tracts of forest. An outbreak in 1975 covered 60 million ha, an area ten times the size of Prince Edward Island.

Inside the cages, sampling is done visually by examining the leaves half-way to the tree-tops. Those measurements are made in conjunction with a bird census and behavioural study conducted by Environment Canada's Canadian Wildlife Service. The spruce budworm's reproductive cycle is measured by random sampling of the number of adult moths. By better understanding its migratory movement and changes in population, scientists hope to be able to improve their ability to predict budworm outbreaks and the need for control measures.

The "trees in cages" project is part of a national Forests Canada effort to find environmentally safe methods of controlling forest pests. These methods include natural controls, such as birds, and the non-chemical biological insecticide

B.t., which in 1987 protected about 500 000 ha of Canada's forests.

The forestry sector is vitally important to Canada's economy. It employs about 750 000 Canadians directly and indirectly, and forest products are the country's single largest source of export earnings. To help enhance the economic, recreational and ecological roles of the nation's forests, Forests Canada undertakes research and development in all aspects of forestry management, and provides technical advice and scientific information to the provinces and private sector. For example, the department has led the development of tree nursery systems that are now in use in all provinces for the production of more than 300 million seedlings. As well, it has developed the Acid Rain National Early Warning System, which has 300 monitoring sites in areas where acid rain may adversely affect the health of trees.

In addition to the Laurentian centre in Quebec, Forests Canada operates major forestry centres and offices in every province. National centres are operated at the Petawawa National Forestry Institute in Chalk River and the Forest Pest Management Institute in Sault Ste. Marie.

For more information, please contact:
Communications Branch
Forests Canada
Ottawa, Ontario
K1A 1G5



Reducing coal's contribution to acid rain

A small generating station on the banks of the Miramichi River is testing the potential of a 60-year-old technology to reduce the acid rain caused by burning Atlantic Canada's coal. If successful, the process may soon be applied to other relatively low-grade fuels that are difficult to burn, including the forestry industry's wood wastes, and coal rejects and oil sands by-products in Western Canada.

The Chatham Generating Station is the primary demonstration facility in the country for emerging fossil fuel technologies. The station, operated by the New Brunswick Electric Power Commission, has two small coal-fired units, a 12.5 megawatt (MW) unit in operation since 1948, and a 22 MW unit completed in 1956. NB Power and the federal government have conducted combustion trials at the plant on a variety of fuels since 1972.

At the core of the current research is acid rain. Canada and the United States have sufficient coal resources to last more than 300 years at present consumption rates. Its relatively lower costs and security of supply compared with imported oil ensure coal's growing role in the country's energy future. The primary concern, however, is how to burn coal in an environmentally acceptable manner. When coal is burned, sulphur oxides, nitrogen oxides and ash are produced, which, when released into the atmosphere, can contribute to acid rain. Coal found in New Brunswick and Nova Scotia is particularly high in sulphur.

A process known as circulating fluidized bed technology (CFB), developed in Germany in the 1920s, has been used commercially in Canada in incinerators for waste materials such as wood wastes and sewage sludge. Only in recent years, however, has the technology been applied in Canada to the burning of coal.

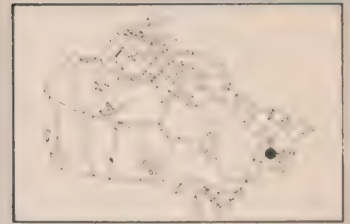
In a CFB boiler, a mixture of coal crushed to pea size, hot ash and limestone is suspended in the lower section of a chamber on jets of air. The turbulent mixing of the materials promotes combustion at temperatures much lower than in conventional boilers. At these lower temperatures, the generation of nitrogen oxides is greatly reduced, and 90% of the sulphur dioxide is captured inside the combustor before it can be released into the atmosphere.

A pilot-scale CFB boiler system was added to one of the Chatham station's units in 1986, with the help of a \$38-million research and development contribution from Energy, Mines and Resources Canada (EMR). The results of ongoing tests will provide essential data for the design of a commercial-sized CFB boiler of 100 to 200 MW. Atlantic Canada utilities are already looking at CFB technology as an efficient, environmentally acceptable alternative to more expensive pollution control measures such as scrubbers.

EMR supports a range of environmental research and development initiatives in cooperation with other governments, universities and industry. Besides the CFB research project, the department has spon-

sored research into the environmental impacts of mining and milling wastes, and into more efficient designs for wood stoves and gas furnaces.

For more information, please contact:
Office of Environmental Affairs
Corporate Policies Evaluation
Branch
Energy, Mines and Resources
Canada
Ottawa, Ontario
K1A 0E4



*Chatham,
New Brunswick*





St. Andrew's, New Brunswick



Supporting Canada's growing aquaculture industry

Canada's oldest fisheries research institution is playing a major role in encouraging the development of the fastest growing sector of the fishing industry — aquaculture, or commercial fish-farming.

Situated in scenic surroundings at Brandy Cove, at the mouth of the St. Croix River, the St. Andrew's Biological Station traces its history back to 1898, when a floating laboratory was moored at the site. Now a key component in a national network of research facilities operated by Fisheries and Oceans Canada, St. Andrew's specializes in the study of Atlantic salmon and other east coast species. Its most recent addition is a commercial-scale salmonid demonstration and development farm to meet the technical and management needs of Atlantic Canada's growing aquaculture industry.

Large-scale aquaculture is still in its infancy in Canada, although it is well-established in several other countries, notably Norway and Japan. In Atlantic Canada, aquaculture generated an estimated \$9 million a year in total revenues in the mid-1980s, and some experts believe this value could increase by as much as 30 times within the next decade. Besides salmonids (salmon and trout), the industry grows oysters, mussels, clams and cod. In support of this industry, the department undertakes scientific and technical research, fisheries management and inspection services, through activities coordinated with provincial governments and industry.

One of the most promising elements of Atlantic Canada aquaculture is commercial salmonid farming, based largely in southern New

Brunswick. There are now more than 34 established companies. It is projected that by the early 1990s, in southern New Brunswick alone, farms will be producing as much as 9500 tonnes of fish a year with a value of \$50 million.

Salmonid aquaculture involves the freshwater rearing of salmon and trout eggs to juvenile fish large enough to survive transfer to salt water as smolts. The smolts are retained in anchored, suspended net cages at inshore sites. They are fed prepared feeds over a period of six to 18 months, until they reach sizes appropriate for marketing as human food, up to nearly 6 kg.

The St. Andrew's demonstration farm, funded through a federal-provincial economic development initiative, opened in 1986. Researchers are evaluating new equipment, management strategies, feeds and stocks. The farm provides demonstrations of practices and techniques, and gives salmonid farmers hands-on experience in new technology. The program is managed by an advisory committee of federal, provincial and industry representatives, with the assistance of a technical committee of scientists from Fisheries and Oceans Canada and other organizations with expertise in the areas of physiology, nutrition, genetics and disease.

For more information, please contact:
Communications Directorate
Fisheries and Oceans Canada
Ottawa, Ontario
K1A 0E6

Safely managing underground storage tanks

One of the nation's most serious environmental challenges is literally buried beneath our feet: the leakage of petroleum products from underground storage tank systems. Gasoline, diesel, heating oil, waste lubricants and other petroleum products are slowly escaping from thousands of old underground tanks across the country, threatening groundwater and the safety of nearby residents.

Prince Edward Island is particularly vulnerable to contamination from leakage. All of the province's domestic and industrial water supplies are derived from groundwater. To respond to this urgent concern, a cooperative government-industry Underground Storage Tank Pilot Project on the island is identifying improved management practices and regulations that will reduce the threat and provide valuable lessons for other provinces.

Underground storage tanks are used by many sectors as a convenient way to store fuel. Nearly half the tanks in Canada are located at retail gasoline outlets. Others are at taxi fleets, bus lines, farms, industries and institutions such as hospitals and schools. In the 1950s and 1960s, thousands of steel underground tanks were installed across the country. Generally, such tanks have a useful life of up to 25 years. It is now estimated that 5% of all tanks and associated piping currently in use are leaking — as many as 10 000 tanks.

About 6.2 million Canadians rely on groundwater for domestic supplies; nearly 40% of all municipi-

palities rely at least partially on groundwater resources; 87% of the water used for livestock is groundwater.

It takes very little fuel to contaminate groundwater — one litre of gasoline can render one million litres of groundwater unfit for human use. Once water is contaminated, the effects can persist for decades. In many cases, clean-up technology is ineffective or prohibitively expensive. The answer must lie in stronger efforts to prevent releases in the first place, and in better early detection to minimize damage.

Sponsored by Environment Canada, the provincial government and the Prince Edward Island Retail Gasoline Dealers Association, the pilot project began in 1986. It is educating key user groups, locating leaking storage tanks and notifying owners of the need to upgrade or replace the tanks. It has also demonstrated and documented the cost savings of improving the management of underground tanks.

While primary responsibility for developing and enforcing legislation and regulations dealing with the problem rests with provincial and municipal authorities, Environment Canada is acting as a catalyst to promote a better understanding of the problem and to increase the sharing of knowledge and expertise among those dealing with it. As well, a task force of federal, territorial, provincial and industry officials is developing national technical standards for the design,

construction, installation and operation of underground tanks for petroleum products.

For more information, please contact:
Industrial Programs Branch
Conservation and Protection
Environment Canada
Ottawa, Ontario
K1A 0H3



*Summerside,
Prince Edward
Island*





Charlottetown, Prince Edward Island

Understanding the impacts of global climate change

By the middle of the next century, parts of this historic city may lie below sea level, the island province's coastline eroded by the rising sea. Much of lower Vancouver and other coastal cities may face the same fate.

But Canada's coastal area will not be the only one to see such dramatic changes. Florida, Bangladesh, and the low countries of western Europe may all be devastated by a rise of up to one metre in the earth's sea level, expected by the year 2050 and triggered by a rapid global warming trend unprecedented in human history.

Air pollution, the burning of fossil fuels, deforestation on a massive scale and even agricultural practices are changing the composition of the earth's atmosphere. There is widespread concern that certain gases released by these activities, particularly carbon dioxide, are now building up in concentrations large enough to affect the delicate balances that govern the earth's climate. In a process widely called the "greenhouse effect," average world temperatures are expected to increase between 1.5 and 4.5 degrees Celsius over the next 50 years.

Virtually no land or water resource in the world will be left untouched by the consequences of a warmer climate. Global food production and trade could be seriously disrupted, particularly in developing countries, as a result of severe drought and flooding.

Canada may be among the most significantly affected nations. Besides a higher sea level, Canada's water, forestry and agricultural resources will be affected. Rainfall patterns may shift northward, bringing drier conditions to southern regions. The grain-producing areas of the Prairies, in particular, would then suffer more frequent and severe droughts. Water levels in the Great Lakes basin could fall significantly, affecting water use in urban areas and shipping volumes, and leading to increased pollution and reduced capacity for hydro-electric generation. Drier climates could reduce forest growth in southern Canada and increase the risk of forest fires.

The changes may also bring potential benefits, however, provided that proper adjustments are made. For example, shipping in the Great Lakes may increase, if the lakes are ice-free throughout the year. Similarly, Arctic shipping may become easier. While southern regions may be drier, they will also experience a longer growing season.

Canadian scientists have been among the leaders in studying the warming trend and in recommending actions to reduce its effects. The Canadian Climate Program, initiated by Environment Canada, is coordinating the research efforts of federal and provincial governments, industry and university experts.

Environment Canada is also working to encourage international action

on safeguarding our global atmosphere, with one goal being an international "law of the atmosphere." Canada recently hosted a milestone international conference dealing with policy responses to the changing atmosphere. The conference called for a 20% reduction in current levels of carbon dioxide emissions in the industrialized world by the year 2025.

For more information, please contact:
Canadian Climate Centre
Environment Canada
4905 Dufferin Street
Downsview, Ontario
M3H 5T4



Preventing and responding to major industrial accidents

On May 31, 1986, fire destroyed a Canning warehouse in which toxic farm chemicals were stored. About 500 residents of the Annapolis Valley farming community were evacuated from their homes because of the hazardous smoke and sickening fumes. Water poured on the blaze became contaminated with the burning herbicides, pesticides and fertilizers, and drained into a nearby river. Police and firefighters battling the fire were treated for exposure to sulphur and phosphorus fumes.

The Canning accident could have been extremely serious, but thanks to proper training and planning by federal, provincial and local officials, the response to the emergency was immediate and effective. No serious injuries occurred and nearly all the residents were able to return to their homes the following day.

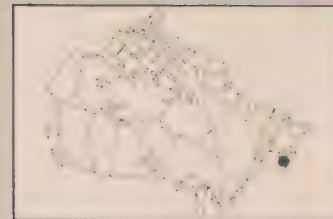
Two years earlier, a tragic accident involving leakage of toxic fumes in Bhopal, India, had killed more than 2000 persons and left tens of thousands seriously injured. Bhopal quickly came to symbolize the catastrophic consequences of failing to manage the toxic chemicals that have become part of our way of life.

In Canada, the response to the Bhopal accident was swift. A task force comprising federal, provincial and chemical industry representatives was formed to assess the adequacy of existing accident preven-

tion and emergency preparedness measures in this country. Chaired by Environment Canada, the group presented 21 recommendations to improve the prevention of and response to major industrial accidents. The recommendations addressed such issues as siting and land-use control, plant-safety management systems, community awareness and emergency training.

To promote and coordinate the implementation of these recommendations, a Major Industrial Accidents Coordinating Committee (MIACC) was formed. Unique in its membership, the committee includes representatives from federal, provincial and municipal agencies, industrial associations, police chiefs and fire chiefs associations and universities. With such broad representation, MIACC serves as a valuable forum for the exchange of information and the airing of concerns among all interested groups.

For more information, please contact:
Industrial Programs Branch
Conservation and Protection
Environment Canada
Ottawa, Ontario
K1A 0H3



*Canning,
Nova Scotia*





Halifax, Nova Scotia — Jakarta, Indonesia



Promoting sustainable development in Indonesia

Halifax and Jakarta could not be further apart on the globe. Yet, from a small office in Dalhousie University, Canadian expertise and educational opportunities are assisting the people of Indonesia in their efforts to protect the fragile tropical environment of the sprawling Asian country of more than 160 million people.

The Indonesian project, and others like it throughout Asia, Africa and Central America, reflect Canada's commitment to making environmental protection a key part of our international development assistance.

With its population growing at 2.3% a year, and spread out over 13 500 islands, Indonesia faces urgent development challenges. In recent years, though, rapid utilization of its natural resources has led to serious concern about the nation's forests, water, soils and coastal ecosystems.

Helping Indonesian governments, citizen groups and industries to respond to this challenge is the goal of a major assistance effort funded by the federal government's Canadian International Development Agency (CIDA). Dalhousie University's Institute for Resource and Environmental Studies is responsible for overall management of the project, which involves the participation of other Canadian universities, as well as consulting companies and non-profit organizations.

The CIDA project is upgrading the environmental management skills of staff of the Indonesian Ministry of State for Population and Environment. Target areas for the Ministry include hazardous substance management, environmental

quality standards, impact assessment, information systems, and education.

The project is also strengthening the environmental management role played by non-profit citizen groups and the private sector in Indonesia. Assistance is provided through technical and policy advisors, training, internships and graduate fellowships in Canada, and exchanges of citizen groups and professionals.

Until very recently, environmental protection was not an important consideration in Third World development efforts. Too often, it was seen as a "luxury" that only wealthier countries could afford. Sadly, it was the poorest nations that suffered most from this neglect of environmental concerns. Caught in a vicious circle of poverty and environmental destruction, many Third World countries were literally destroying today the resources needed for tomorrow. Forests were cut down for fuel; marginal farmland was overworked to feed growing populations.

Today, the harsh realities of global environmental crises such as the spread of deserts and the shrinking of the world's forests have forced nations, both rich and poor, to recognize the inseparable links between a healthy environment and a healthy economy. In 1987, the World Commission on Environment and Development warned that environmental concerns must be built into economic and social development plans. The Commission urged that all nations work towards a goal of "sustainable development" — development that "meets the needs of the present without compromising the ability

of future generations to meet their own needs."

As an acknowledged leader in international development efforts, Canada is helping make the goal of sustainable development a reality. With projects ranging from the most basic, as in food aid, to the most sophisticated, such as communications satellite dishes, Canada devotes about two cents out of each dollar of federal spending to international assistance, about \$2.7 billion in 1987-88.

For more information, please contact:
Public Affairs Branch
Canadian International
Development Agency (CIDA)
Ottawa, Ontario
K1A 0G4

Preserving Canada's cultural heritage

A grassy plain at the northernmost tip of Newfoundland's Great Northern Peninsula is the site of the oldest known European settlement in the New World. Beneath the turf at L'Anse aux Meadows, archaeologists have discovered the remains of a Viking settlement occupied about the year 1000.

A showpiece of Canada's national historic parks and sites system, L'Anse aux Meadows was declared a UNESCO World Heritage Site in 1978. Digging has uncovered the remains of several sod buildings, including three large dwellings, two small workshops, and a smithy where local bog iron was worked. The design of the houses and the artifacts found inside, such as a bronze pin, a soapstone spindle whorl, a stone lamp and iron rivets, attest to the settlement's Norse origins.

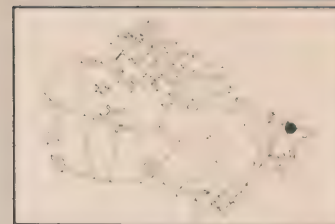
Today, the lifestyle of these early visitors is depicted in three sod houses that have been recreated near the site of the archaeological remains. Reproductions of many of the artifacts are exhibited in the visitor reception area.

The visitor centre is open from mid-May to mid-October, but the park grounds are open year-round. Picnicking and camping facilities are provided at nearby Pistolet Bay, and commercial accommodation is available at St. Anthony, 48 km from the park.

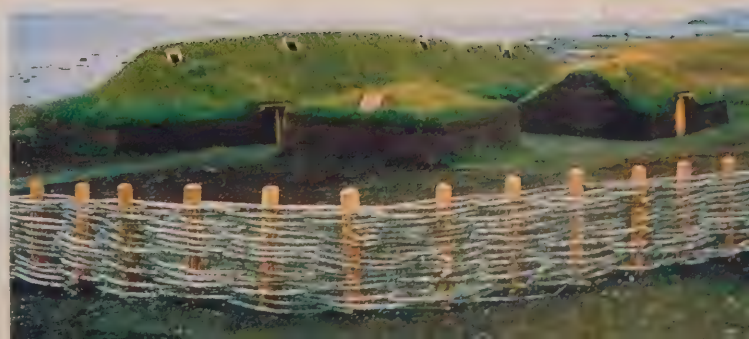
While many of Canada's national parks are justifiably world-famous, our 75 historic parks and sites, nine heritage canals and more than 900 national historic plaques are less well known, even within our own country. Operated by the Canadian Parks Service of Environment Canada, these are special places that celebrate the achievements of our ancestors.

The national historic parks and sites system began in 1917 at Fort Anne in Annapolis Royal, Nova Scotia. Today, Canadians can explore their rich history at sites literally from coast to coast: from L'Anse aux Meadows to the reconstructed French fortress of Louisburg in Nova Scotia, to a restored fur-trading post at Lower Fort Garry, near Winnipeg, to Vancouver Island's Fisgard Lighthouse, the oldest permanent navigational aid on the west coast.

For more information, please contact:
National Historic Parks and Sites
Directorate
Canadian Parks Service
Environment Canada
Ottawa, Ontario
K1A 0H3



St. Anthony, Newfoundland





St. John's, Newfoundland



Joining forces with volunteer weather watchers

Every morning at 7 a.m., a retired school-teacher in St. John's steps outside and walks to a white box with louvred sides that stands in his backyard. With a confidence that comes from years of routine, he reads two thermometers, recording temperature extremes since his last reading. Kneeling down by a rain gauge on the ground, he measures the amount of rain that has fallen overnight. Finally, he looks around the yard and then writes in his notebook: "sunny and strong winds." At 6 p.m., the readings and recordings are repeated. Twice a day, every day of the year.

Across the nation, in backyards and forest clearings, on farms, schools and university campuses, more than 2000 Canadians are making similar observations. From all walks of life and from all age groups, they make up Canada's unique team of volunteer climate observers.

Canada's weather service is one of the few federal activities that uses more volunteers than paid employees to carry out its programs. Environment Canada supplies and maintains the observers' equipment and covers operating costs. The regular, precise observations of the volunteer weather observers form the backbone of Canada's climate database. Observations are mailed monthly to Environment Canada's regional offices and entered into computers at the department's Climate Centre in Downsview, Ontario. Built up over years by the volunteers, the observations provide basic facts about the country's climate that help Environment Canada respond to more than 200 000 requests a year for climatic data.

Many observation stations are operated by individuals, while some observers share the tasks with family members and neighbours. Some stations have been maintained by the same volunteer family over many years, the work being passed on from one generation to the next. One family in Brucefield, Ontario, and another in Ranfurly, Alberta, have observed weather at their homes since the early 1900s and have each involved three generations in the task.

In recent years, two specialized volunteer programs have started, bringing the total number of volunteers to about 5000. In central and western Canada, severe weather watchers help provide early warnings for hailstorms, damaging winds, and funnel-shaped clouds that may turn into tornadoes. On the Great Lakes and along the West Coast, about 50 small craft owners make up the mariner reporting program, informing weather centres of any conditions that have suddenly worsened or weather at sea that differs greatly from forecasts.

For more information, please contact:

Information Directorate
Atmospheric Environment Service
Environment Canada
4905 Dufferin Street
Downsview, Ontario
M3H 5T4

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